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A SCIENTIFIC INTERPRETATION OF KUATSU,
OR THE JAPANESE METHOD OF
RESTORING LIFE.

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Kuatsu, or the restoration of life, is an integral part of jiu jitsu. The latter is usually regarded wholly as a means of physical training and as a method of combat, but when the victim is "knocked out," recourse is had by adepts to definite methods of resuscitation known as kuatsu.

Many centuries ago, when jiu jitsu was primarily conceived in Japan, kuatsu was used for reviving individuals who were rendered unconscious by the various systems of jiu jitsu, but later it was shown that kuatsu was equally effective in instances of sunstroke, drowning, and injuries from other causes.

It is stated that the adept in jiu jitsu inflicts no injury that cannot be promptly remedied by the aid of kuatsu, whereas our pugilists may inflict blows which may render their opponents unconscious and yet are unable to do anything to revive them. The captious critics of kuatsu seek to dispose of the supposed exaggerated claims of the latter by the derisive observation that the jiu jitsu man is able to restore those whom he kills.

The line of demarcation between life and death is difficult of determination and an individual should, paradoxical as it may appear, only be regarded as dead when it is demonstrated that he is not alive. The extraordinary tenacity of life shown by the expected heart is really marvelous. By artificial per-

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fusion Kuliabko elicited well marked contractions of the entire heart of the rabbit five days after the death of the animal, and the same authority completely revived the heart of a four year old boy who had died of pneumonia twenty-four hours after death.

A study of the charts in any representative work¹ on jiu jitsu shows a number of points on the body surface which, when struck, will cause either insensibility or death. The writer has exerted firm pressure over the various points in question and noted that in the majority of instances there was a reflex inhibition of the heart during the period of pressure. The latter effects were more evident when the sphygmograph was employed. The writer has demonstrated elsewhere (1), however, that the heart may be inhibited reflexly practically anywhere on the body surface, but that the definite points of election are the intercostal spaces, the abdomen, the muscles of the neck, and the region on either side of the spine corresponding to the upper dorsal vertebræ. Irritation of the mucosa of the stomach, nose, and rectum is equally effective in inhibiting the heart, but, if the mucous membranes in question have been previously cocainized, such inhibition does not ensue.

Inhibition of the organ in the foregoing instances is effected by reflex sensory impulses acting on the vagus, the inhibitory nerve of the heart. It is well known to physiologists that atropine paralyzes the motor endings of the vagus. The writer has utilized the latter fact in investigating the heart reflex (to which reference will be made later), and in studying inhibition of the heart by the manœuvres mentioned.

¹A representative work of this character is that of Hancock, *The Complete Kano Jiu-Jitsu*. There are many systems of jiu-jitsu in Japan, but the Kano system has been adopted by the government.



An injection of 0.001 gramme (1/60 grain) of atropine will manifest its action within thirty minutes after the hypodermic injection and disappears in from one to three hours. During the full physiological action of the atropine, the heart reflex is abolished and pressure on various points (cardioinhibitory areas) will no longer inhibit the heart.

Jiu jitsu contestants may yet avail themselves of the foregoing fact.

Small doses of pilocarpine are almost exactly antagonistic in their action to atropine, and this applies in all cogency to their action on the vagus. After a hypodermic injection of pilocarpine (1/10 grain), one may note an exaggerated heart reflex and an accentuation of cardiac inhibition during the time pressure is made on definite cardioinhibitory areas.

In this contribution, we are specially interested in kuatsu in so far as it relates to the restoration of respiration and circulation.

The subject is placed in the prone posture with arms extended sideways and the operator with his wrist lands severely upon the seventh cervical vertebra with the regularity of a carpenter striking with a hammer. As soon as the patient recovers consciousness, he is placed in a sitting posture, his arms are rotated, and he is aided in walking. The latter injunction is regarded as mandatory in the application of kuatsu, the object being to completely restore the functions of the circulation and respiration, otherwise, it is said the patient relapses into unconsciousness.²

The heart reflex.—To fully comprehend what has preceded, reference must be made to the heart

²The minute details of the method are not recounted although regarded as important by authors on the subject. In the opinion of the writer, the essential feature of the method is concussion of the seventh cervical spine.

reflex. Attention was first directed (2) to this phenomenon in 1898 by aid of the x rays.

The reflex under consideration is a contraction of the myocardium of varying duration, which results when the skin of the precordial region is irritated. The cutaneous irritant may vary from a spray of ether to rubbing with a towel or by a series of percussion blows.

Myocardial contraction ensues in the sagittal and transverse diameters of the organ. Percussion of the muscles causes a retraction of the right ventricle only (myopathic heart reflex).

The reflex in question is easily observed with the x rays, although accurate percussion will show that, after outlining the heart, a notable retraction may be demonstrated after cutaneous irritation. The contraction of the myocardium implicates both ventricles of the heart after cutaneous irritation, although as a rule it is more evident in the left than in the right ventricle. It may also be noted that the myocardial recession persists even after the source of cutaneous irritation is removed.

Merklen and Heitz in the third edition of their work on the heart (*Examen et séméiotique du cœur*) observe that, while in the normal subject, the heart reflex of Abrams may be of short duration, in cardiectasis it may persist for several hours.

The diagnostic value of the heart reflex is exhaustively discussed in my recent work on *Spondylotherapy* (3).

Respecting the employment of the heart reflex in the treatment of cardiac insufficiency, one finds in the literature only a dearth of information, but I believe, from my personal experience, that more can be accomplished in a few days by elicitation of the heart reflex in myocardial insufficiency than by months of treatment with the conventional methods

of Schott. The resistance movements and the balneological methods of Schott act by evoking the heart reflex, and it is only a question of how effectively this reflex may be discharged by the Schott system in comparison with other methods. It has already been noted that small doses of pilocarpine will accentuate the heart reflex, hence in the use of the Schott or any other method this drug is destined to prove a valuable adjunct in treatment. Thus, the degree of myocardial retraction (heart reflex) after scratching the præcordial region, with the blunt point of a pencil as determined by percussion measured 2 cm., and estimated by the x rays, it measured 1.2 cm. Thirty minutes after an hypodermic injection of pilocarpine (1/10 grain), the heart reflex by percussion measured 4.5 cm., and by the x ray, 2.7 cm.

This discrepancy between the percussional and x ray findings is quite intelligible. The heart reflex implicates the sagittal as well as the transverse diameter of the organ, and in consequence of the latter retreating from the chest wall, it eludes the percussion blow which is not propagated far enough to elicit dulness of the heart. The latter factor plays no rôle in the x ray examination.

Heitz (4) observes that *Le réflexe cardiaque d'Abrams* is a good guide by which to determine the probable effect of a contemplated balneological treatment.

If the size of the heart does not change under excitation of the reflex (by sharp blows over the præcordial region), the treatment will be ineffectual or may even be contraindicated, on account of the probable development of cyanosis.

In very large dilatations and in advanced myocardial degeneration, the heart does not respond to pericardial excitation and is not favorably influ-

enced by baths. If the reaction is feeble, good results may be achieved, but the treatment must be used cautiously.

More recently Zulawski (5) investigated the *Abramsscher-Herzreflex* and found that rubbing or striking of the heart region reduced the dulness of the heart from one to one and a half centimetres and that it was of prognostic importance in myocardial weakness. If, he continues, one can demonstrate the heart reflex even in high grades of cardiac insufficiency, a good prognosis may be given.

It must be confessed that accurate percussion of the heart is necessary to determine slight differences in the cardiac diameter after præcordial excitation, but, by the method of percussion advocated by the author in his book on *Spondylotherapy* and described elsewhere (6), the difficulties of this physical method of examination is minimized.

Bloch, of Franzensbad, according to Satterthwaite, successfully uses carbonic acid douches for eliciting Abrams's heart reflex in myocardial insufficiency.

The author has shown that the heart reflex may be elicited from various regions of the body and in his studies of the amplitude of the reflex in question, he found that the most effective site is the *spinous process of the seventh cervical vertebra*, and that the most effective method is a pneumatic hammer or any similar apparatus giving a percussion stroke.

The writer has had an opportunity of gauging the efficacy of vertebral concussion in many acute infectious diseases implicating the heart and he has noted the almost miraculous action of the method in question.

Recently, the writer saw a patient with apex pneumonia in consultation with Dr. V. G. Vecki,

of San Francisco, the eminent genitourinary specialist. The patient was practically moribund. During the course of her disease, the conventional cardiac stimulants were employed. Suddenly during the night, however, she became extremely cy-

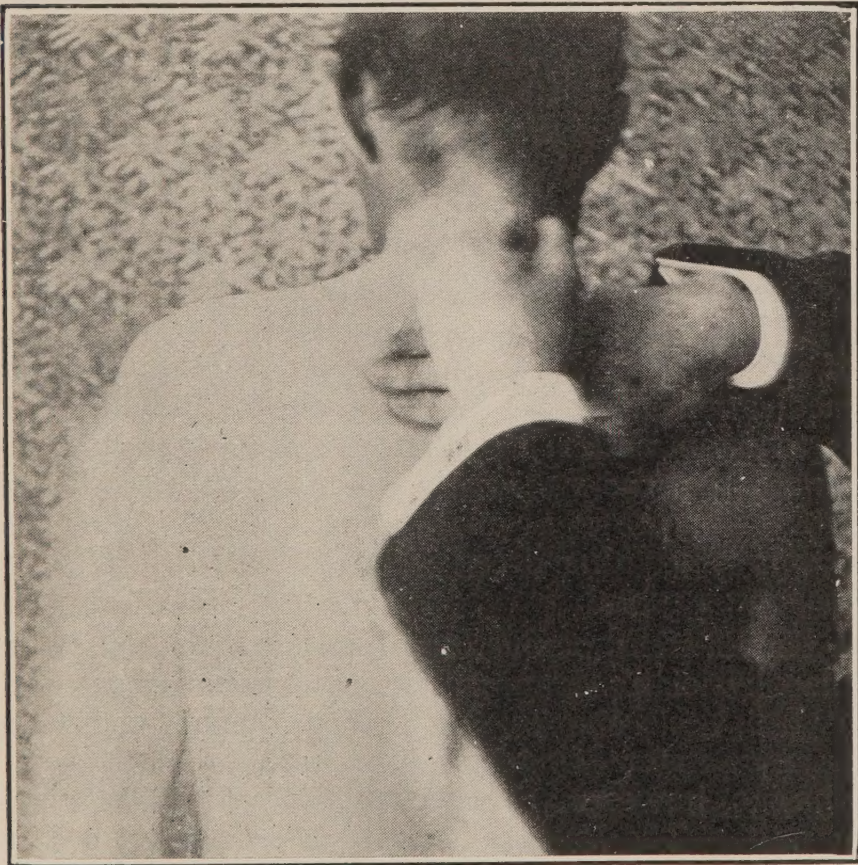


FIG. 1.—Showing the method of concussing the spinous process with the hands for eliciting the heart reflex.

anotic and pulseless and it was determined to concuss the seventh cervical spine to awaken, as it were, the enervated heart. No percussion apparatus was at command and, in lieu of the latter, the palmar surfaces of the fingers were applied to the seventh

cervical spine, and, with the clenched fist, the dorsal surfaces of the fingers were struck a series of short and vigorous blows (Fig. 1). The latter method of concussion was continued for about ten minutes with intervals of rest. Soon after concussion was commenced, the cyanosis became less evident and the pulse was again perceptible. Every two hours during the night this method was continued and thereafter at less frequent intervals until convalescence was established. It was evident to the nurses and others that after each *séance* of the concussion treatment there was an immediate evanescence of the cyanosis and the pulse always became stronger and less frequent.

It is conceded that pneumonia is the most fatal of all acute diseases, that there exists no specific medication, and that the most important indication is to maintain the circulation. I am firmly convinced that the systematic execution of the method cited will prove of material aid in hastening recovery from this dread disease, which otherwise may prove fatal.

An efficient percussion apparatus should be at the physician's command in all acute diseases and, as Dr. Vecki suggests, after operations when there is any danger of cardiac implication. I must emphasize, however, the necessity of a suitable apparatus. The latter must give a percussion stroke. All other motions, such as oscillations, shaking, and friction, yield absolutely no results.

Cardiac tonicity and innervation.—The resistance of the myocardium in stretching during diastole represents the tonicity of the cardiac muscle. In the normal state stretching of the cardiac parietes is effected by the pressure of the blood which enters the heart from the large veins and is essential-

ly a venous pressure. It follows that in high venous pressure, provided the cardiac tonicity is compromised, a cardiac dilatation must ensue. In the latter condition the amount of residual blood in the

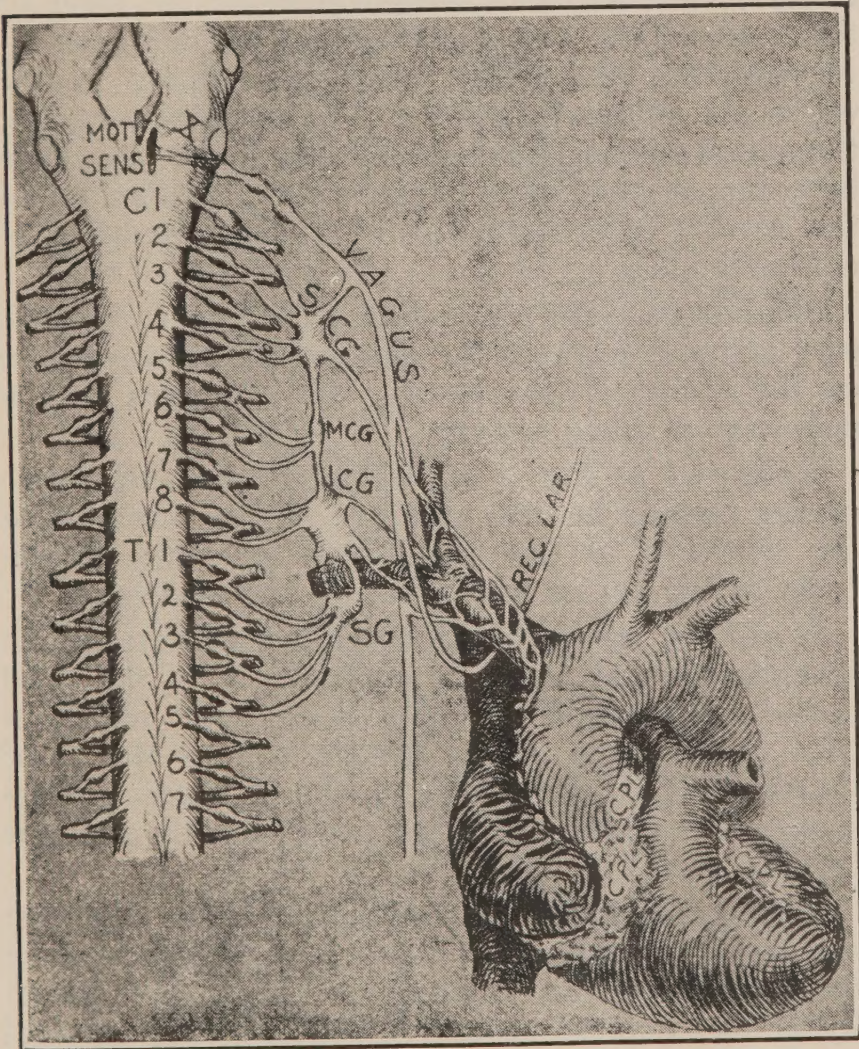


FIG. 2.—Origin and course of the cardiac nerves. Motor and sensory nuclei of the efferent (motor) and afferent (sensory) fibres of the vagus. C, 1 to 8 and T, 1 to 8, cervical and thoracic (dorsal) spinal nerves; SCG, MCG, ICG, superior middle and inferior cervical ganglia; REC LAR, recurrent laryngeal nerve; CPL, cardiac plexus (after Powell, Gibson, and Hirschfelder).

heart usually exceeds the systolic output of the organ.

In the vagus of the frog there is one set of fibres which only influences the heart rate (chronotropic effects), whereas another set increases the force of the contraction and cardiac tonicity without affecting the rate. The latter tonic fibres in the vagus are stimulated by the usual cardiotonics, but the action of the latter is inhibited if the vagi have been cut or paralyzed by atropine. The action of the cardiac nerves has always been a subject of contention.

The vagus slows the action of the heart (inhibitory action), whereas the accelerator nerves quicken the action of the heart. Both nerves in the norm are in tonic activity.

Reference to Fig. 2 shows the origin and course of the cardiac nerves, and Fig. 3, the relations of the segments of the spinal cord and their nerve-roots to the bodies and spines of the vertebræ.

It will be noted that, the spinous process of the seventh cervical vertebræ corresponds to the third dorsal segment of the spinal cord and which in turn corresponds to the root origin of the third thoracic nerve. Reference to Fig. 2, shows the association between the latter nerve and the inferior cervical ganglion.

The writer has shown empirically that the best site for stimulating the vagus and thus increasing the force of cardiac contraction and cardiac tonicity is the spinous process of the seventh cervical spine. The most effective excitant of the heart reflex is concussion, which is a mechanical stimulus and that the reflex in question may be elicited with the same certainty and precision as are the reflexes by the vivisectionist in his laboratory.

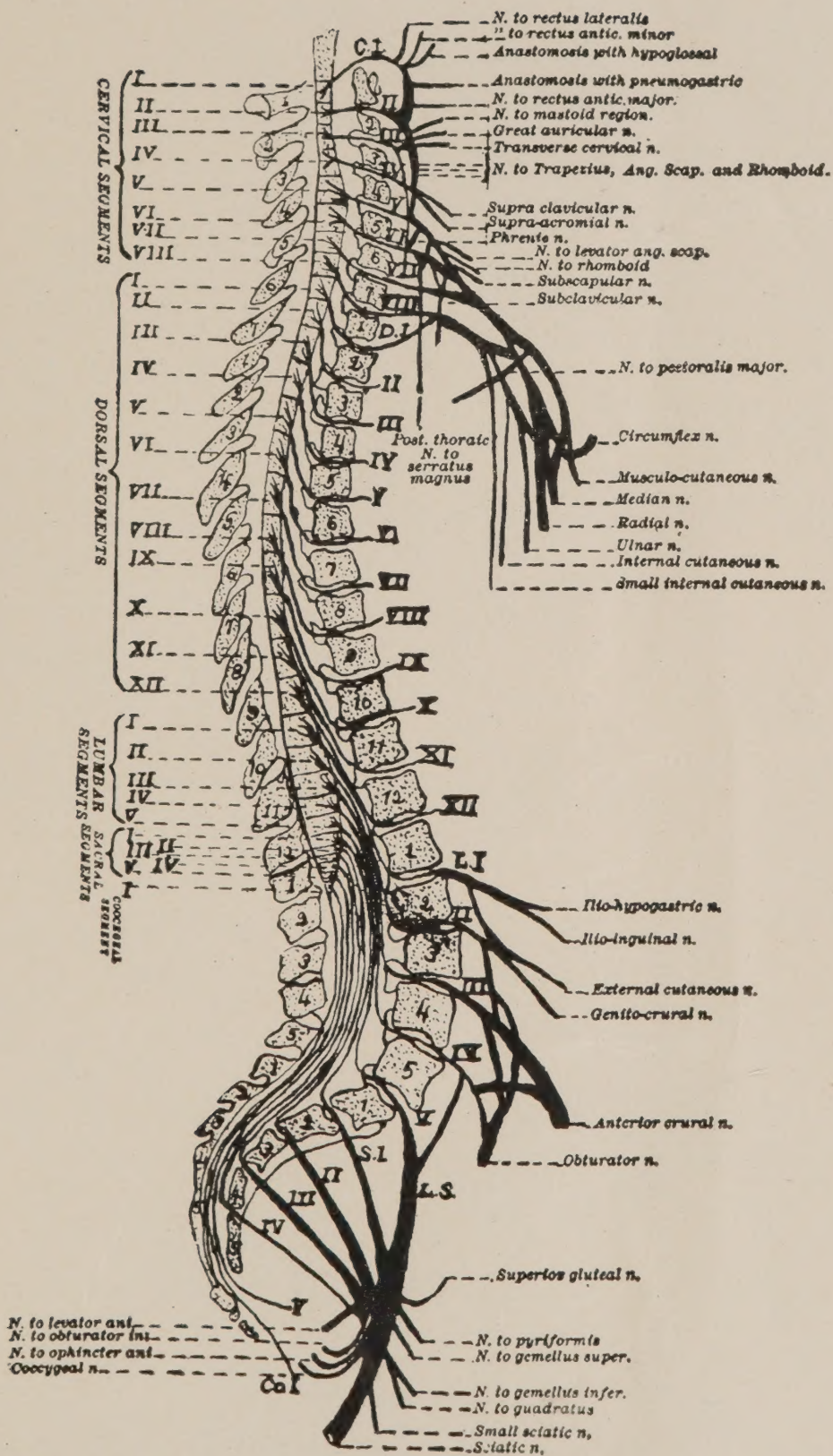


FIG. 3.—The relations of the segments of the spinal cord and their nerveroots to the bodies and segments of the vertebrae. (Déjérine and Thomas, modified by Starr.)

Abrams: Kuatsu.

A just appreciation of the latter facts by the clinician will prove of great value to him in the treatment of myocardial insufficiency and as an aid in resuscitation. They also explain the kuatsu method of reanimation.

In conclusion, I may say for academic purposes only that the heart reflex cited is the heart reflex of contraction. The counter reflex of dilatation, may be evoked when the spinous processes of the ninth, tenth, eleventh, and twelfth dorsal vertebræ are rapidly concussed in succession.

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